lower, but the differences, always very small, were not unfrequently negative. In September *the lower hemisphere appeared decidedly the hotter of the two.* The maximum difference rather exceeded 2° (by the galvanometer), being almost identical with the result obtained in the month of March *in the opposite direction.* Moreover, this maximum occurred from the 14th to the 16th September, which also corresponds with the epoch of the greatest depression of the solar equator."

Sig. Secchi remarks, that the influence of the solar spots upon the temperature is very striking. Sometimes a spot, which did not occupy more than $\frac{1}{100}$th of the aperture of the pile, caused the temperature to fall 3°, or about $\frac{1}{15}$th of the whole intensity. He found, however, by isolating the spot with a diaphragm, that it exercises a sensible influence even in the obscure part.

Extract of a Letter from Mr. Lassell.

"*Valetta*, 1*st Nov.* 1852.

"You will, I hope, have received a letter I wrote to you shortly after my arrival, giving you my first naked-eye impressions of this climate. I am now enabled to say that I find it quite as favourable for the use of the telescope as I had anticipated—incomparably more so than at Starfield, both in respect of quantity and quality of clear sky. My first observation through the telescope was on the 5th of last month, but it was not completed in respect of clock-motion and driving apparatus until the 16th, and on the 26th we were visited with a tremendous "*gregale*," which, beside causing some shipwrecks with loss of life in the harbour, and upsetting a whole battery of 24-pounders as if they had been ninepins, gave my roof a tremendous shake, and, partly dislodging it from the wall, would, I believe, have carried it quite away, if it had not "brought up" against the strong frame-work of the polar axis. Happily no injury was done to the telescope beyond crushing the tube of the finder, and that without injury to the optical part. This has lost me some eight or ten days; but all the mischief is now repaired, and since the 27th I have observed every night, the weather having settled again so as to be even finer than before the storm. The principal objects viewed are, as you may surmise, *Neptune*, *Uranus*, and *Saturn*, the last being an object of such surpassing interest as to absorb almost more than its share of attention. I send you herewith a careful drawing of its present appearance; and, if viewed through a blackened tube with one eye, at the distance of three or four feet, it presents so exact a fac-simile of the picture afforded by the 20-foot telescope and a power of 650 that I know not how to introduce a correction. I have compared it carefully with the telescopic image, by having it well illuminated and placed alongside the eye-piece, in order to form this estimation, and the only thing that suggests itself as a possible improvement of its accuracy, would be *a very slight* increase of breadth of the outer

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ring at the expense of the breadth of inner bright ring. To rival the original, however, in *beauty*, I find to be impossible, especially from want of proper colouring. The two principal equatoreal belts are of a ruddy brown colour, changing pretty suddenly at the southern edge of the most southern of these belts into a dusky bluish-green colour, very much deepened around the south pole, the exact place of which seems to be marked out by a circular lighter shade. This dusky portion is much variegated by minute dark stripes and lines, which defy imitation with the pencil. One of the most striking attendant phenomena which I now note for the first time, is the *evident transparency of the obscure ring*. [I intend in future, in speaking of the rings, to adopt M. Otto Struve's nomenclature, calling the outer ring *A*, the intermediate *B*, and the obscure ring *C*.] The ring C, crossing the ball, is of a much lighter texture or colour than the other parts, and both limbs of the planet can readily be traced through it, and quite as plainly as in the drawing, when the latter is treated as I have pointed out. The effect is precisely that of a band of *crape* stretched within the ring, which, projected on the white ball, would appear of a lighter hue than where projected on the dark sky. There is evidently, also, a sudden paleness of the main division of the rings where it crosses the ball—scarcely sufficiently marked in the drawing—as if in some degree, at least, the ball were seen through the division. The shading on the inner edge of the ring *B* extends clearly within one-third of its entire breadth of the outer edge, and during some rare glimpses appeared to me as if it were constructed in narrow concentric circles. No division, properly so called, could at any time be traced or imagined on the ring *A*; but there was an evident *shade* in the middle of its breadth, and occupying about one-third of it. This was seen night after night with different powers, from 297 to 650, so that I am perfectly satisfied of its existence, nearly as shown in the drawing. Its depth of shade is rather deeper than the darkest shading of *B* close to its inner edge.

"A remarkable sudden projection of the shadow of the ball on the ring, where it crosses the division, was noticed especially from the 5th to the middle of October, when the shadow was much larger than it now is. It is just indicated in the drawing, but not so palpably as in the original when best seen. I am not able to say whether or not it is an optical deception, arising from the juxtaposition of the division and shadow. A more remarkable phenomenon was repeatedly noticed on the opposite limb, appearing like an elongated spot, sometimes extending up to the division, but generally falling short of it, and projected on the ring *B*. That something was there I am persuaded, but I can offer no explanation of it.

"I must now allude to a most extraordinary anomaly, which I confess myself utterly at a loss to explain. Notwithstanding the exquisite views I have had of the planet since my arrival here, far exceeding in sharpness of definition all I have ever seen at Starfield, I have never obtained a single glimpse of the division in the ring *C*,

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seen and measured micrometrically by M. Otto Struve; nor of the ring being concentrally divided into two, as seen by Mr. Dawes. On every occasion, and when most sharply defined, it appears of one uniform texture and depth of shape, constantly conveying to my mind the idea of network or a crape veil, as I originally described it. Moreover, when best seen, the part crossing the ball seemed of uniform density, the northern edge not appearing sensibly darker than the southern.

"If what I have described should not give an adequate notion of the amount of precision or sharpness of the telescopic image, I may add, that *Enceladus*, even when over the ball, and now not more than the narrowest breadth of the ring from it, is not to be overlooked; and *Mimas*, when at a considerable distance from his greatest elongation, is steadily seen with various powers, from 297 to 650, with the splendour of the planet fully view. The vast difference of visibility of *Mimas* and *Enceladus* is only to be appreciated by those who have seen both together.

"The superiority of vision I am now enjoying is not confined, however, to *Saturn*; I am enabled to watch the satellite of *Neptune* every night—completely round his orbit. On the 30th of October I observed him very near his closest approach to the planet, and certainly then with extreme difficulty, being, as nearly as I could judge, not more than eighth-tenths of the planet's diameter from his limb. My usual micrometer powers, of 614 and 760, failed to show the satellite, and it was only after trying a succession of single lenses that a power of 1917 at last brought it out. The two new satellites of *Uranus*, too, *Ariel* and *Umbriel*, I have been enabled, not only to see, but to measure micrometrically—a thing I was never able to do in England, as I was there always obliged to hide the planet in order to see them. I hope, therefore, to get a large and good series of measures of these and of the satellite of *Neptune*, as well as of the old satellites of *Uranus*, the results of which I will send you in due time.

"I believe, however, that *all* the advantages of vision of which I speak do not arise from the climate and greater altitude of the objects, but in some sensible degree from the increased perfection of the figure of the speculum. You will remember I some time ago mentioned that I was engaged in some attempts to improve the action of the polishing-machine, in producing the utmost attainable *regularity* of curve. After a great many elaborate contrivances, none of which satisfied me, I hit upon a very simple modification, which, I think, answers the end perfectly, and enables me to produce far more perfect figures, and with much more ease and certainty than formerly. I intend to take an early opportunity of sending you a description of the mechanism superadded to the machine. After the addition of this improvement, I refigured, shortly before I left home, specula *A* and *C*, both of which I brought with me, but as yet I have only worked with *A*.

"I presume that, unless another hurricane blows away my observatory, I am located here for the next three or four months."